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Success Story

Paint Wastewater Recovery

Technology to Reclaim and Reuse Wastewater Minimizes Hazardous Waste

Benefits

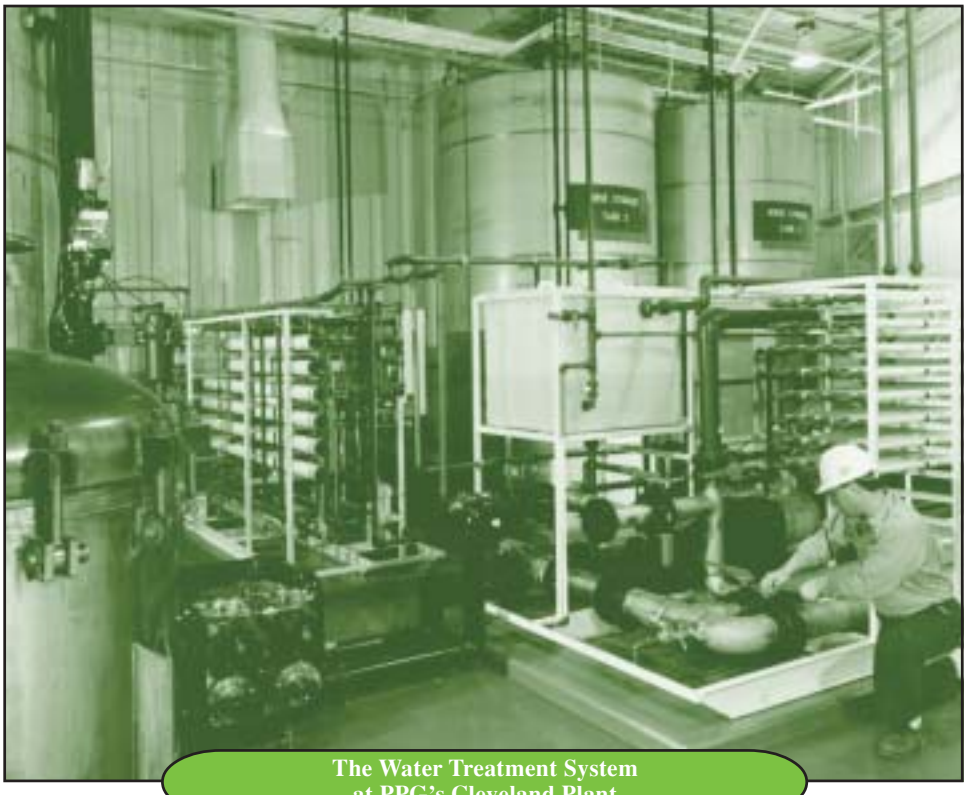
- A 20-fold reduction in volume of hazardous waste requiring expensive treatment, storage, and disposal
- Reduced air pollutant emissions as a result of the reduction in hazardous waste that must be transported and incinerated
- Reduced fresh-water requirements by hundreds of thousands of gallons annually per installation

Applications

This technology can be used for reclaiming industrial wastewater for reuse in a process. The automotive coatings and painting industry and other water-based coating industries could also use this process.

To ensure the quality of water-based automotive primer coatings, the equipment used in coating productions must be regularly cleaned. Water is the primary cleaning agent for this equipment, but results in wastewater that contains pigments and solvents. That wastewater then must be disposed of as hazardous waste.

PPG Industries, Inc., is the world's largest producer of automotive and industrial coatings. Each year PPG's plant in Cleveland, Ohio generates 400,000 gallons of wastewater (has been as high as 700,000 gallons) from cleaning coating equipment. The plant's disposal cost for the wastewater ranges from $0.80 to $1.24/gallon.



The Water Treatment System at PPG's Cleveland Plant

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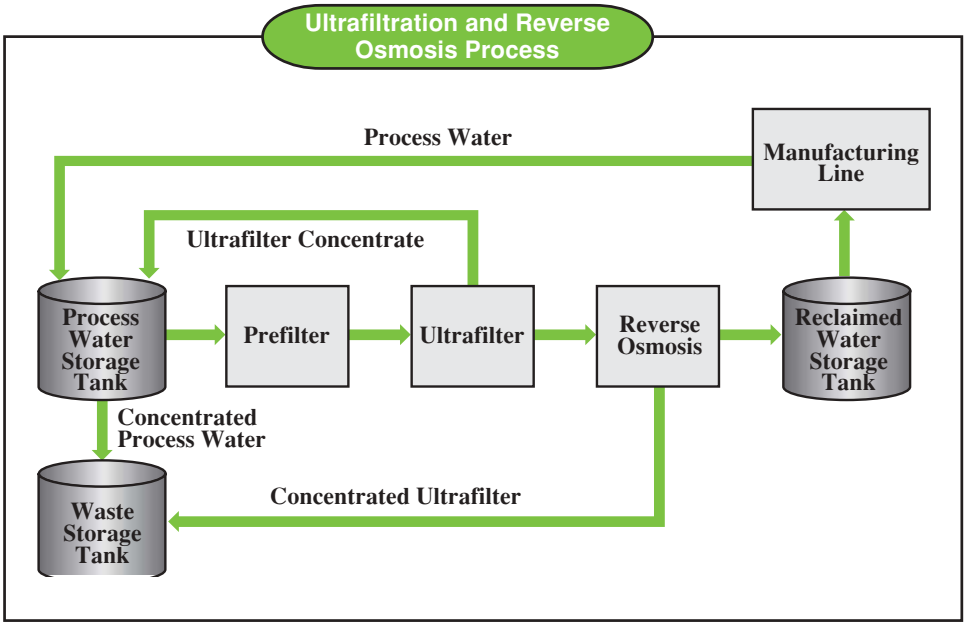
To solve its wastewater problem, the PPG Cleveland plant installed a combined ultrafiltration/reverse osmosis process to reclaim and reuse the wastewater. PPG developed and installed the new process with support from the U.S. Department of Energy's NICE^3 (National Industrial Competitiveness through Energy, Environment, and Economics) Program and Zenon Environmental Systems. "Source reduction is our primary goal, then recycling, then energy recovery," stated Erwin Frey, C&R environmental engineering associate. "Treatment and offsite disposal are last-resort options."



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ENERGY EFFICIENCY AND
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U.S. DEPARTMENT OF ENERGY

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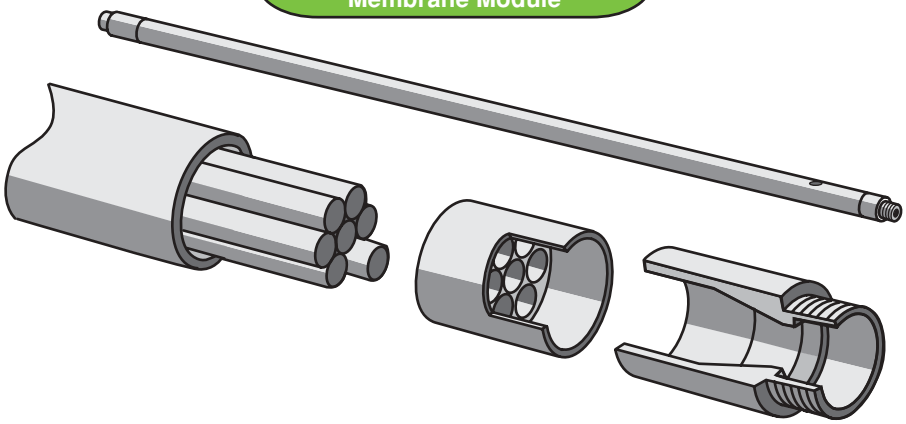
Project Partners

- Ohio Department of Development
  Columbus, OH
- PPG Industries, Inc.
  Cleveland, OH
- Zenon Environmental Systems, Inc.
  Burlington, Ontario

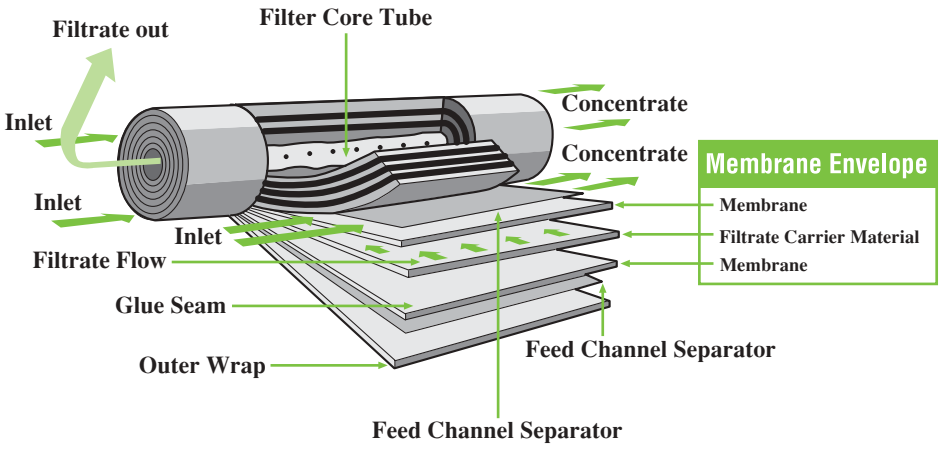
Typical Ultrafiltration Membrane Module



Technology Description

Both the ultrafiltration and reverse osmosis technologies have been commercially available for decades. However, PPG's new system combines ultrafiltration with reverse osmosis to form a progressive filtering system applicable to water containing paint residues and solvents. The contaminated wastewater is collected and prefiltered to remove large solids. Next, the ultrafiltration unit removes suspended solids and high-molecular-weight particles. Reverse osmosis units then remove the smaller impurities. The reclaimed water is pumped to a storage tank for reuse in cleaning, and the concentrated volume of waste solids is collected for disposal.

Spiral Wound Reverse Osmosis Membrane Module



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Demonstration Results

The combined ultrafiltration/reverse osmosis system was installed at the Cleveland plant in April 1992 and began operating in June 1992. The new equipment did not require any changes to the production processes and did not affect the rate of product throughput.

The wastewater reclaim and reuse system at the Cleveland plant is providing an annual net savings of about $200,000. The capital investment was approximately $450,000. With the NICE^3 grant, the payback was less than 9 months.

Installing the system at the Cleveland plant has also resulted in environmental benefits and energy savings. The system has substantially reduced the amount of contaminated water requiring offsite disposal generated at the plant from 400,000 gallons to less than 20,000 gallons annually, reducing the number of tanker truck trips to a hazardous waste facility from 65 to 4. As a result, air emissions are reduced, as well as the amount of waste requiring incineration at the disposal facility. The plant has also experienced significant energy savings from reduced fuel use to transport and incinerate the waste and from reduced treatment requirements for deionized water.

Industry of the Future — Chemicals

The chemical industry is one of several energy- and waste-intensive industries that participate in OIT's Industries of the Future initiative. In December 1996, the chemical industry published a report, entitled ***Technology Vision 2020: The U.S. Chemical Industry,*** *that helps establish technical priorities for improving the industry's competitiveness and develops recommendations to strengthen cooperation among industry, government, and academia. It also provides direction for continuous improvement through step-change technology in new chemical science and engineering technology, supply chain management, information systems, and manufacturing operations.*

OIT Chemicals Team Leader: Paul Scheihing (202) 586-7234.

NICE^3 – National Industrial Competitiveness through Energy, Environment, and Economics: An innovative, cost-sharing program to promote energy efficiency, clean production, and economic competitiveness in industry. This grant program provides funding to state and industry partnerships for projects that demonstrate advances in energy efficiency and clean production technologies. Awardees receive a one-time grant of up to $525,000. Grants fund up to 50% of total project cost for up to 3 years.

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